

PATENT SPECIFICATION

(11) 1 460 732

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- (21) Application No. 10065/73 (22) Filed 1 March 1973
 (23) Complete Specification filed 25 March 1974
 (44) Complete Specification published 6 Jan. 1977
 (51) INT CL² B26B 21/08/21/22 21/24 21/26
 (52) Index at acceptance
 B4B 33D1 33E 36D1
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(19)



(54) SAFETY RAZOR

(71) We, THE GILLETTE COMPANY, a Corporation organised under the laws of the State of Delaware, United States of America, of Prudential Tower Building, Boston, Massachusetts 02199, United States of America, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention is concerned with safety razors.

Safety razors conventionally comprise a guard member and a cap member between which, in use, a razor blade is sandwiched, and a handle, the guard member, the cap member and the handle being fixed relative to one another in use. The latter feature is present both in the conventional so-called three-piece razors designed to take disposable single or double-edged blades (such razors being called "three-piece" because the three parts mentioned above, that is the guard member, the cap member and the handle, can be separated) and in the conventional so-called one-piece razors designed to take disposable single or double-edged blades (such razors being called "one-piece" because the three parts mentioned above are not separable). This feature is also present in safety razors which have recently appeared on the market which comprise, instead of a disposable razor blade, a disposable shaving unit or head which comprises a guard member, one or more blades, and a cap member held rigidly together, the shaving unit being rigidly attachable to a handle and being replaced as a whole when the cutting edge or edges become blunt.

In the following description and claims we will, for convenience, refer to the combination of the guard member, the blade or blades, and the cap member as the shaving unit, and it is to be understood that this expression is intended to cover combinations of these elements in which the elements are permanently secured

together, the whole shaving unit being replaced when the cutting edge or edges become blunt, and also combinations in which these elements are not permanently secured together and in which the cap member and the guard member are separable to permit replacement of the blade or blades only.

Razors in which there is a fixed relationship between the shaving unit and the handle, call for considerable dexterity on the part of the user and substantial changes in the disposition of the handle in order to maintain the shaving unit at the optimum attitude on the shaver's face, particularly when negotiating areas, such as the jaw lines, where there are gross changes in facial contour.

Seen from one aspect, the invention provides a safety razor comprising a handle, a shaving unit (as herein defined) pivotal mounting means by which the shaving unit is mounted on the handle so as to extend generally forwardly therefrom, and which permit pivotal movement of the shaving unit relative to the handle about an axis extending parallel with and adjacent the cutting edge or edges of the unit, and restoring means for biasing the unit towards a medial pivotal position relative to the handle.

The invention also provides a safety razor comprising a handle, a shaving unit (as herein defined) having two cutting edges arranged close to and parallel with each other, pivotal mounting means by which the shaving unit is mounted on the handle for pivotal movement relative to the handle about an axis extending parallel with and adjacent the cutting edges of the unit, and restoring means for biasing the unit towards a medial pivotal position relative to the handle.

When using a razor according to the invention, it has been found that the shaving unit accommodates itself readily to change in facial contours.

In the embodiments described and illustrated herein, the shaving units shown

are of the known type comprising two cutting edges arranged close to and parallel with each other. In its application to razors having shaving units of this type, the pivoted mounting means assist in ensuring that both edges are effective during shaving.

The shaving unit may be directly but detachably mounted on the handle, but in most of the embodiments described and illustrated below, the unit is detachably mounted on a separate support member which is, in turn, pivotally mounted on the handle and thus constitutes a part of the pivotal mounting means.

It is not normally necessary for the pivotal mounting and/or the restoring means to permit the shaving unit to pivot through more than 90° and it is generally preferred that the permitted range of pivotal movement should be through 40°. The medial position to which the spring means urges the shaving unit is preferably the centre point of the possible range of pivotal movements.

Further advantages and preferred features of the invention will appear from the following description of certain presently preferred embodiments of the invention, given with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a first embodiment of razor with the shaving unit partly cut away;

Figure 2 is an exploded perspective view of a second embodiment of razor;

Figure 3 is a perspective view, partly cut away, of a third embodiment of razor;

Figures 4a and 4b are diagrammatic end elevations of the shaving unit pivoting means forming part of the embodiment shown in Figure 3;

Figure 5 is a perspective view of a fourth embodiment of razor;

Figure 6 is a side view of the razor of Figure 5; and

Figure 7 is a cross-section of the razor of Figure 5.

Referring to Figure 1, the razor comprises a handle 10 to which is rigidly secured a transversely extending support yoke 11 which includes forwardly extending arms 12. Pivotally mounted between the arms 12 by means of pivot pins 13, is an inner support yoke 14 which also comprises forwardly extending arms 15 which lie within and generally parallel to the arms 12. The arms 15 carry trunnions or pins 16 which extend outwardly through arcuate slots 17 in the arms 12. The outer face of each arm 12 is provided with a block 18 to which are secured the ends of two cantilever leaf springs 19, the free ends of which lie on either side of and engage the projecting portion of pin 16. Each arcuate

slot 17 subtends an angle of 90° at the axis of the adjacent pivot pin 13 and the springs 19 serve to bias each pin 16 towards the median position, that is the position shown in Figure 1, of the possible pivotal movement of the pin 16, and thus the inner support yoke 14, about the pivot pin 13. The inner support yoke 14 can therefore move pivotally $\pm 45^\circ$ from the median position shown in Figure 1.

A shaving unit 20 (only a part of which is shown in Figure 1) is detachably mounted on the inner support yoke 14 by means of inwardly directed rails 21 on the base of the shaving unit, which clip over the longitudinal edges of the inner support yoke 14. The shaving unit 20 comprises a guard portion 22, two spaced blade elements 23 and 24, and a cap portion 25, all secured permanently together, the complete unit being discarded when the cutting edges are blunt and replaced by a fresh unit.

In use, the shaving unit 20 carried by the inner support yoke 14, is able to pivot about the axis of the pivot pins 13 which is adjacent to and parallel with the cutting edges of the blades 22 and 23 for 45° on either side of the median position shown in Figure 1.

In the embodiment shown in Figure 2 the handle 10 of the razor is provided with a rigidly attached transversely extending support yoke 26 which has forwardly extending arms 27 provided with pivot holes 28 in which, when assembled, corresponding trunnion pins 29 provided on the end faces of the shaving unit 20 are located. The pins 29 define a pivotal axis for the shaving unit which is adjacent to and parallel with the cutting edges of the blades of the shaving unit. In order that the shaving unit may be detachably mounted in the support yoke 26, the latter is formed of a slightly resilient material, such as metal strip of a suitable gauge, so that the end portion 27 can be sprung apart to permit introduction of the shaving unit 20 therebetween. Secured to the support yoke 26 between the arms 27, is a leaf spring 30, the free end of which abuts the rails 21 on the base of the shaving unit 20 and which serves to limit the pivotal movement of the shaving unit and to bias the shaving unit towards a medial position of its permitted pivotal movement.

The razor shown in Figure 3 comprises a handle 31 which is hollow at the top to form a housing 32 having a forwardly facing opening. Located within the housing 32 and projecting through the forward opening thereof, is a parallel linkage 33 which comprises a top plate 34 and a bottom plate 35 pivotally linked together by pairs of triangular side plates 36 and 37, and a

transversely extending support member 38 that has outwardly directed longitudinal flanges 39. The support member 38 lies outside the housing 32.

5 The two end plates 36 are pivotally mounted on a spindle 40 and the two end plates 37 on a spindle 41, the ends of the spindles 40 and 41 being secured to the housing 32.

10 The razor also comprises a shaving unit 20 which is removably mounted on the support member 38; the flanges 39 of the latter being dimensioned to fit within the inwardly directed rails 21 of the shaving unit.

15 The parallel linkage 33 can swing as shown in Figure 4b from a medial position shown in Figures 3 and 4a (and in the opposite sense) to impart an effective rotational movement to the shaving unit about an axis which is closely adjacent the cutting edges of the shaving unit, and is parallel with the said edges. The razor also comprises a spring (not shown) located within the housing 32 and acting on the parallel linkage 33 to bias the latter towards the medial position shown in Figures 3 and 4a.

20 The razor shown in Figures 5 to 7 comprises a handle 42 to which is rigidly secured a transversely extending outer part-cylindrical shell bearing member 43, to which is attached an inner part-cylindrical shell bearing member 44. The shell bearing member 43 has an axially outwardly extending part-cylindrical (arcuate) flange 45 at each end, and the inner shell bearing member 44 has an axially inwardly directed undercut arcuate groove 46 at each end. The shell bearing members 43 and 44 are slidably attached together by the reception of flanges 45 within grooves 46. The outward face of the inner shell bearing member 44, opposite its curved surface, is provided with a support member 47 having outwardly directed longitudinal flanges 48.

45 The razor also comprises a shaving unit 20 which is removably mounted on support member 47, the flanges 48 of the latter being dimensioned to fit within the inwardly directed rails 21 of the shaving unit.

50 Secured within the handle 42 is a leaf spring 49 which passes through a slot 50 in the outer shell bearing member 43. The free end of spring 49 is located within a recess 51 in projecting stop member 52 carried by the inner shell bearing member 44. The slot 50 and stop member 51 are so dimensioned that movement of the inner shell bearing member 44 with respect to the outer shell bearing member 43 may only take place within the limits defined by the ends of slot 50 and stop member 52. The radius of curvature of the shell bearing members 43

and 44 is such that the effective axis 53 of rotation of the shaving unit 20 is adjacent to and parallel with the cutting edges of blades 22 and 23 and approximately midway between the skin engaging surfaces 54, 55 of the cap and guard respectively of the shaving unit 20. More specifically, the axis 53 is subtended by the complementary arcuate guide surfaces presented by the grooves 46 and flanges 45.

70 During a shaving stroke, the active elements of the shaving unit, e.g. the blades 22, 23 and cooperating leading and following surfaces 54 and 55, are permitted to move as a unit independently of the position of handle 42 to follow the configuration of the skin surface being shaved during each shaving stroke, the shaving unit rotating about axis 53. In this embodiment, the plane of the active elements of the shaving system is allowed to swing in either direction from the medial position shown in Figure 6, the engagement of projection 52 with the upper end of slot 50 limiting movement in one direction, as shown in Figure 7, and the engagement of projection 52 with the lower end of the slot 50 providing a limit on motion in the other direction.

75 Whilst a number of specific ways of mounting a shaving unit for pivotal movement relative to the razor handle have been described above, it will be understood that other arrangements can be used.

80 The above described arrangements are employed to particular advantage when the shaving unit comprises two blade elements whose respective cutting edges are parallel with and close to each other, the edges operating in tandem during use of the razor. The pivotal mounting of the shaving unit helps to ensure, in such cases, that proper use is made of the second edge, i.e. that both edges, and not just the first or leading edge, play their part in the shaving operation.

85 The invention can, however, be employed with advantage with other types of shaving unit, including those of "three-piece" razors, "ribbon" type razors in which an elongated flexible blade element is advanced stepwise and longitudinally to present a fresh portion of its cutting edge when the preceding portion has become dulled, and injector type razors, in which the platform and cap members are sprung apart to release a blade which is ejected and replaced by the insertion of a fresh blade from a dispenser which is specifically designed for use with the razor.

WHAT WE CLAIM IS:—

1. A safety razor comprising a handle, a shaving unit (as herein defined), pivotal mounting means by which the shaving unit

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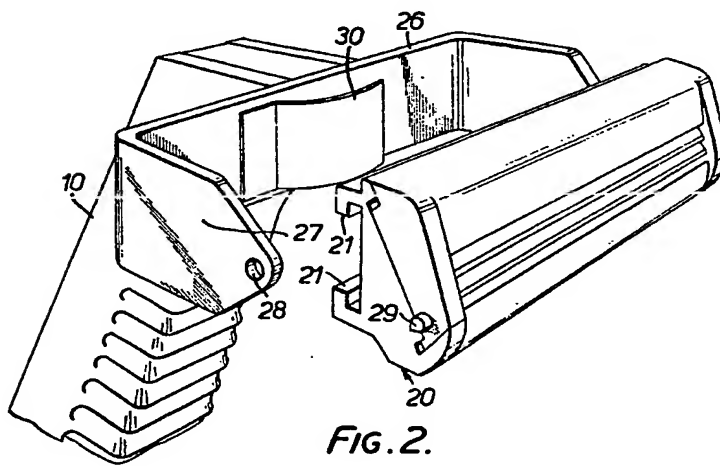
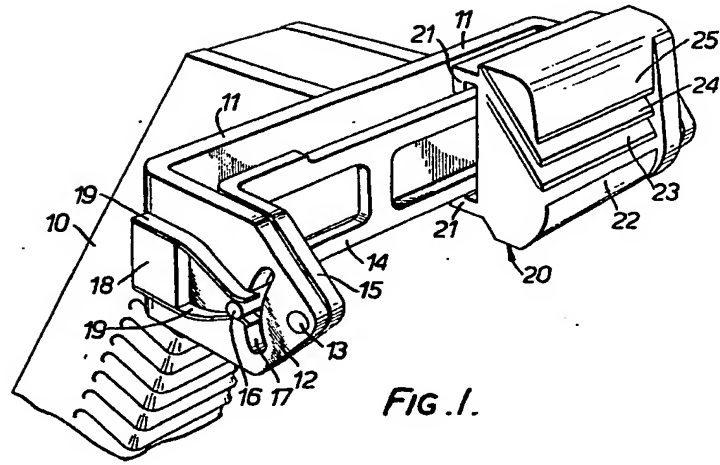
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- is mounted on the handle so as to extend generally forwardly therefrom, and which permit pivotal movement of the shaving unit relative to the handle about an axis extending parallel with and adjacent the cutting edge or edges of the unit, and restoring means for biasing the unit towards a medial pivotal position relative to the handle.
- 5 2. A safety razor comprising a handle, a shaving unit (as herein defined) having two cutting edges arranged close to and parallel with each other, pivotal mounting means by which the shaving unit is mounted on the handle for pivotal movement relative to the handle about an axis extending parallel with and adjacent the cutting edges of the unit, and restoring means for biasing the unit towards a medial pivotal position relative to the handle.
- 10 3. A safety razor according to claim 1 or 2, wherein the said medial position is at the centre of a permitted range of pivotal movement of the unit, relative to the handle.
- 15 4. A safety razor according to claim 1, 2 or 3, wherein the range of pivotal movement of the unit is in the range 40° to 90°.
- 20 5. A safety razor according to any preceding claim wherein the pivotal mounting means includes a support member connected to the handle and upon which the shaving unit is detachably mounted.
- 25 6. A safety razor according to any preceding claim, wherein the handle is provided with a fixed yoke extending transversely to the handle and having at its opposite ends forwardly projecting arms, the shaving unit being pivotally mounted between the said arms on trunnion bearings.
- 30 7. A safety razor according to claim 6, wherein the spring means comprises cantilever leaf spring means extending longitudinally of the said arms and acting between the yoke and the shaving unit.
- 35 8. A safety razor according to any one of claims 1 to 4, wherein the handle is provided with a fixed yoke extending transversely to the handle and having at its opposite ends forwardly projecting arms between which the shaving unit is received and mounted on trunnion bearings, and wherein the spring means act between the yoke and the shaving unit.
- 40 9. A safety razor according to any one of claims 1 to 5, wherein the mounting means includes a parallel linkage whose pivotal axes are parallel with the cutting edge or edges of the unit and mounted on the handle, the shaving unit being carried at that end of the said linkage which is further from the handle.
- 45 10. A safety razor according to any one of claims 1 to 5, wherein the pivotal mounting means includes a set of arcuate guide surfaces subtending the pivotal axis of the unit and co-operating with a set of complementary guide surfaces provided on the handle.
- 50 11. A safety razor according to claim 10, wherein one set of said guide surfaces is formed by an arcuate groove, and the co-operating set of guide surfaces is formed by an arcuate flange engaging in the said groove.
- 55 12. A safety razor, substantially as herein described, with reference to Figure 1, Figure 2, Figures 3, 4a and 4b, or Figures 5, 6 and 7 of the accompanying drawings.
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3 SHEETS

*This drawing is a reproduction of
the Original on a reduced scale*

Sheet 2

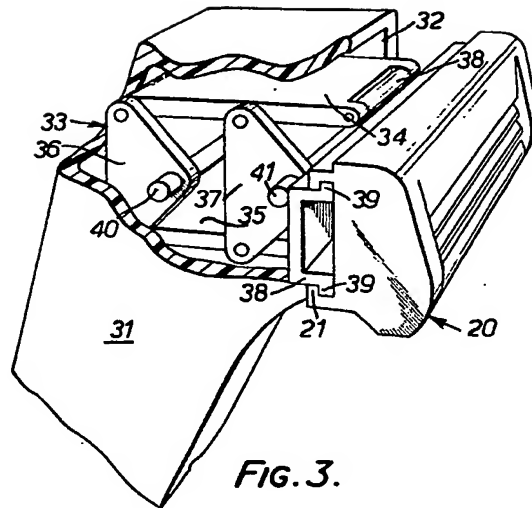


FIG. 3.

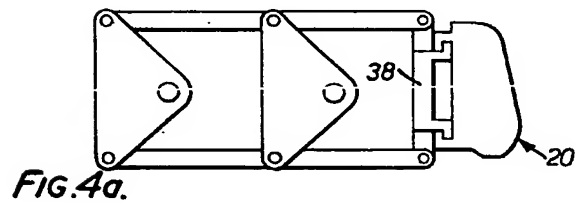


FIG. 4a.

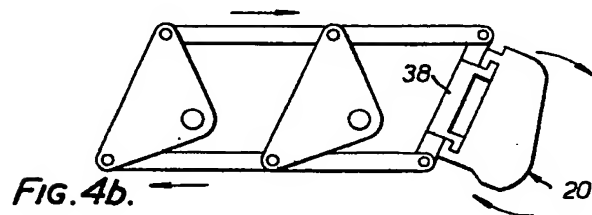


FIG. 4b.

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COMPLETE SPECIFICATION

3 SHEETS

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Sheet 3

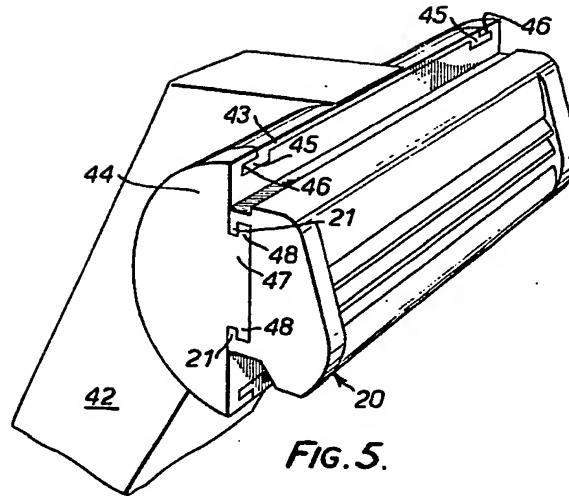


FIG. 5.

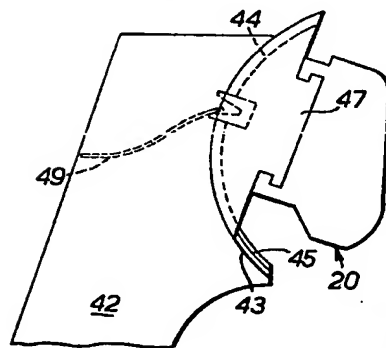


FIG. 6.

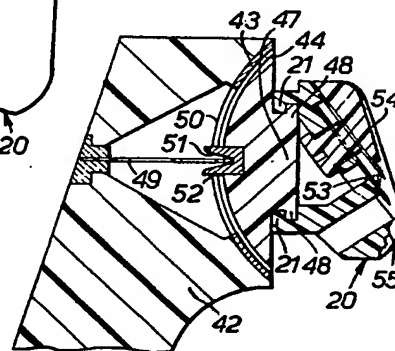


FIG. 7.